



UNITED STATES PATENT AND TRADEMARK OFFICE

UNITED STATES DEPARTMENT OF COMMERCE
United States Patent and Trademark Office
Address: COMMISSIONER FOR PATENTS
P.O. Box 1450
Alexandria, Virginia 22313-1450
www.uspto.gov

APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/716,685	11/19/2003	Marcel Johannes Janssen	2003B111	8131

23455 7590 01/10/2006

EXXONMOBIL CHEMICAL COMPANY
5200 BAYWAY DRIVE
P.O. BOX 2149
BAYTOWN, TX 77522-2149

EXAMINER

BULLOCK, IN SUK C

ART UNIT	PAPER NUMBER
----------	--------------

1764

DATE MAILED: 01/10/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Application No.	Applicant(s)	
	10/716,685	JANSSEN ET AL.	
	Examiner	Art Unit	
	In, Suk Bullock	1764	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 19 November 2003.
- 2a) ☐ This action is FINAL. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters; prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 1-93 is/are pending in the application.
- 4a) Of the above claim(s) 50-70 is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 1-49 and 71-93 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☒ Claim(s) 1-93 are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on 19 November 2003 is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
 2. ☐ Certified copies of the priority documents have been received in Application No. _____.
 3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).

* See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|--|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input checked="" type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date <u>11/19/03, 8/24/04, 9/27/04, 3/10/05,</u> | 6) <input type="checkbox"/> Other: _____ |
| <u>4/12/05, + 5/3/05.</u> | |

DETAILED ACTION

Election/Restrictions

Restriction to one of the following inventions is required under 35 U.S.C. 121:

- I. Claims 1-49 and 71-93, drawn to a process for producing light olefins, classified in class 585, subclass 638.
- II. Claims 50-70, drawn to a process for producing alcohols, classified in class 518, subclass 700.

The inventions are distinct, each from the other because of the following reasons:

Inventions I and II are directed to related processes. The related inventions are distinct if the inventions as claimed do not overlap in scope, i.e., are mutually exclusive; the inventions as claimed are not obvious variants; and the inventions as claimed are either not capable of use together or can have a materially different design, mode of operation, function, or effect. See MPEP § 806.05(j). In the instant case, the inventions as claimed have different effect. Invention I is directed to producing light olefins whereas Invention II is directed to producing alcohols.

Because these inventions are distinct for the reasons given above and have acquired a separate status in the art because of their recognized divergent subject matter, restriction for examination purposes as indicated is proper.

During a telephone conversation with Mr. Frank Reid on December 19, 2005 a provisional election was made with traverse to prosecute the invention of Group I, claims 1-49 and 71-93. Affirmation of this election must be made by applicant in

Art Unit: 1764

replying to this Office action. Claims 50-70 are withdrawn from further consideration by the examiner, 37 CFR 1.142(b), as being drawn to a non-elected invention.

Applicant is reminded that upon the cancellation of claims to a non-elected invention, the inventorship must be amended in compliance with 37 CFR 1.48(b) if one or more of the currently named inventors is no longer an inventor of at least one claim remaining in the application. Any amendment of inventorship must be accompanied by a request under 37 CFR 1.48(b) and by the fee required under 37 CFR 1.17(i).

Information Disclosure Statement

The IDS filed August 24, 2004 indicates that there are two pages. However, only the first page is on file as having been received. If there is a page two, please provide the second page.

Claim Rejections - 35 USC § 102

The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

Claims 1, 2, 17, 18, 24, and 25 are rejected under 35 U.S.C. 102(b) as being anticipated by U.S. Patent 6,441,262 to Fung et al. (hereinafter Fung).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing a mixture of methanol,

Art Unit: 1764

ethanol, propanol, and butanol with a molecular sieve catalyst in an alcohol contact zone under conditions effective to produce olefins (e.g., ethylene, propylene). The alcohol feed may contain from about 1-90 wt% methanol, from about 5-90 wt% ethanol, from about 5-90 wt% propanol, and from about 5-90 wt% butanol. See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve materials (e.g., ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

The alcohol contact zone is deemed to anticipate claim 1 of the present invention wherein an alcohol-containing stream comprises methanol, ethanol, a C3 alcohol and a C4 alcohol.

The step wherein the alcohol contacted catalyst is directed to the oxygenate conversion reactor wherein it is contacted with methanol is deemed to anticipate claim 2

Art Unit: 1764

of the present invention wherein a methanol-containing stream and a fuel alcohol-containing stream are combined to form the alcohol-containing stream.

Claim Rejections - 35 USC § 103

The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

The factual inquiries set forth in *Graham v. John Deere Co.*, 383 U.S. 1, 148 USPQ 459 (1966), that are applied for establishing a background for determining obviousness under 35 U.S.C. 103(a) are summarized as follows:

1. Determining the scope and contents of the prior art.
2. Ascertaining the differences between the prior art and the claims at issue.
3. Resolving the level of ordinary skill in the pertinent art.
4. Considering objective evidence present in the application indicating obviousness or nonobviousness.

This application currently names joint inventors. In considering patentability of the claims under 35 U.S.C. 103(a), the examiner presumes that the subject matter of the various claims was commonly owned at the time any inventions covered therein were made absent any evidence to the contrary. Applicant is advised of the obligation under 37 CFR 1.56 to point out the inventor and invention dates of each claim that was not commonly owned at the time a later invention was made in order for the examiner to consider the applicability of 35 U.S.C. 103(c) and potential 35 U.S.C. 102(e), (f) or (g) prior art under 35 U.S.C. 103(a).

Art Unit: 1764

Claims 8-16 and 19-23 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing a mixture of methanol, ethanol, propanol, and butanol with a molecular sieve catalyst in an alcohol contact zone under conditions effective to produce olefins (e.g., ethylene, propylene). The alcohol feed may contain from about 1-90 wt% methanol, from about 5-90 wt% ethanol, from about 5-90 wt% propanol, and from about 5-90 wt% butanol. See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve materials (e.g., ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

Art Unit: 1764

Fung does not teach the exact same claimed range amount of methanol, ethanol, propanol, and butanol contained in the alcohol feed nor the weight ratio of methanol to C2-C4 alcohol. However, overlapping ranges have been held to be prima facie evidence of obviousness. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Fung by selecting the portion of Fung's weight percent range for each alcohol component that corresponds to the claimed range. *In re Malagari*, 182 USPQ 549 (CCPA 1974).

Fung, also, does not teach the claimed weight ratio of ethylene to propylene. In light of Fung teaching overlapping wt% range of each alcohol component, it is expected that the weight ratio of ethylene to propylene produced by the process of Fung would overlap with the present claimed range. Moreover, Fung teaches one may vary the desired olefin product by employing greater proportion of the corresponding alcohol in the feed (e.g., greater proportion of ethanol results in additional ethylene in the olefin product). See specifically col. 2, line 66 to col. 3, line 11 and col. 4, lines 26-30.

Claims 3-7 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung) as applied to claims 8-16 and 19-23 above, and further in view of U.S. Patent 4,822,825 to Bhattacharya et al. (hereinafter Bhattacharya), U.S. Patent 4,751, 248 to Lin et al. (hereinafter Lin), U.S. Patent 4,752,263 to Stevens et al. (hereinafter Stevens) and U.S. Patent 6,114,279 to Fukui et al. (hereinafter Fukui).

The teachings of Fung are as discussed above.

Art Unit: 1764

Fung does not teach the conversion of syngas to methanol and fuel alcohol and nor the catalysts for said conversion.

The reference to Bhattacharya teaches a method for producing a mixture of lower aliphatic alcohols from syngas in the presence of a catalyst comprising ZSM-5 (col. 2, lines 19-45).

The reference to Lin teaches a method for converting syngas to aliphatic alcohols containing at least two carbon atoms comprising the steps of passing the syngas through a first catalyst zone comprising Co and MgO/ZnO and then through a second catalyst zone comprising Cu/ZnO/Al₂O₃. See col. 1, lines 25-60.

The reference to Stevens teaches a process for producing mixed alcohols from syngas in the presence of a catalyst comprising Co/MoS₂, an alkali promoter, and a co-catalyst metal selected from Co, Ni, and Fe. The process is highly selective to producing C₂₋₅ aliphatic alcohols while selectivity to methanol is low. See col. 3, lines 35-45; col. 4, lines 33-41; and col. 5, lines 10-17.

The reference to Fukui teaches a catalyst for methanol synthesis comprising copper, zinc, and aluminum oxides (see Abstract).

It is well known and conventional in the art to convert syngas to various alcohols depending on the catalyst and other factors employed. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Fung by including the sources of methanol and higher alcohols from conversion of syngas in the presence of appropriate catalysts as taught

Art Unit: 1764

by Bhattacharya, Lin, and Stevens because these are well known and conventional sources.

Claims 26-49 and 71-93 are rejected under 35 U.S.C. 103(a) as being unpatentable over U.S. Patent to Fung et al. (hereinafter Fung) in view of U.S. Patent 4,822,825 to Bhattacharya et al. (hereinafter Bhattacharya), U.S. Patent 4,751, 248 to Lin et al. (hereinafter Lin), U.S. Patent 4,752,263 to Stevens et al. (hereinafter Stevens) and U.S. Patent 6,114,279 to Fukui et al. (hereinafter Fukui).

The reference to Fung teaches a process for converting an oxygenate feed to an olefin product comprising contacting an alcohol feed containing a mixture of ethanol, propanol, and butanol with a molecular sieve catalyst in an alcohol contact zone under conditions effective to produce olefins (e.g., ethylene, propylene). The alcohol feed may contain from about 1-90 wt% methanol, from about 5-90 wt% ethanol, from about 5-90 wt% propanol, and from about 5-90 wt% butanol. See col. 3, lines 12-39 and col. 4, lines 20-35. The alcohol contacted catalyst is then directed to the oxygenate conversion reactor where it is contacted with at least one oxygenate to produce olefins (col. 11, lines 1-9). The oxygenate, preferably methanol, is added at one more points to the oxygenate conversion reactor and/or to the catalyst feed from the alcohol contact zone (col. 5, lines 1-11). The molecular sieve catalyst is selected from SAPO-5, SAPO-17, SAPO-18, SAPO-20, SAPO-34, SAPO-44, SAPO-56, the metal containing forms of each thereof, or mixtures thereof. Additional molecular sieve materials (e.g., ZSM-5) can be included as a part of the SAPO catalyst composition or they can be used as

Art Unit: 1764

separate molecular sieve catalysts in admixture with the SAPO catalyst. See col. 7, lines 12-45 and col. 9, lines 9-26. Conventional separation means are used to separate the desired olefins, such as ethylene and propylene, into individual fractions. These olefins are then polymerized to form polyethylene and polypropylene as desired. See col. 11, lines 21-39 and Figure 1.

The Fung reference can be interpreted in two ways. The first interpretation is that the alcohol feed comprising a mixture of ethanol, propanol and butanol (see specifically col. 3, lines 26-29) is equivalent to the present claimed fuel alcohol-containing stream. The separate methanol feed which is directed to the oxygenate conversion reactor is equivalent to the present claimed methanol-containing stream. So, the step wherein a mixture of the alcohol contacted catalyst and methanol is directed to the oxygenate conversion reactor (see specifically col. 11, lines 1-9) is deemed to read upon the present claimed combination of a methanol-containing stream and a fuel alcohol-containing stream. It is the position of the examiner that the alcohol contact catalyst from the alcohol contact zone would include unreacted alcohol components (e.g., methanol, ethanol, propanol, and butanol) in addition to the olefin products.

The second interpretation of Fung is that the alcohol feed comprising methanol, ethanol, propanol, butanol (see specifically col. 3, lines 26-30 and col. 4, lines 20-22) is equivalent to the present claimed combined methanol-containing stream and fuel alcohol-containing stream.

Fung does not teach separate the source of the methanol stream and the source of the alcohol stream.

The reference to Bhattacharya teaches a method for producing a mixture of lower aliphatic alcohols from syngas in the presence of a catalyst comprising ZSM-5 (col. 2, lines 19-45).

The reference to Lin teaches a method for converting syngas to aliphatic alcohols containing at least two carbon atoms comprising the steps of passing the syngas through a first catalyst zone comprising Co and MgO/ZnO and then through a second catalyst zone comprising Cu/ZnO/Al₂O₃. See col. 1, lines 25-60.

The reference to Stevens teaches a process for producing mixed alcohols from syngas in the presence of a catalyst comprising Co/MoS₂, an alkali promoter, and a co-catalyst metal selected from Co, Ni, and Fe. The process is highly selective to producing C₂₋₅ aliphatic alcohols while selectivity to methanol is low. See col. 3, lines 35-45; col. 4, lines 33-41; and col. 5, lines 10-17.

The reference to Fukui teaches a catalyst for methanol synthesis comprising copper, zinc, and aluminum oxides (see Abstract).

It is well known and conventional in the art to convert syngas to various alcohols depending on the catalyst and other factors employed. Therefore, it would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the process of Fung by including the sources of methanol and higher alcohols from conversion of syngas in the presence of appropriate catalysts as taught

Art Unit: 1764

by Bhattacharya, Lin, and Stevens because these are well known and conventional sources.

Also, it is within the level of a skilled artisan to combine the methanol-containing stream with the fuel alcohol-containing stream in view of Fung teaching the relative amounts of ethylene and propylene produced by the oxygenate to olefin conversion process is in part dependent upon the composition of the alcohol feed.

With respect to the claimed range amount of methanol, ethanol, propanol, and butanol and the weight ratio of methanol to C2-C4 alcohol, overlapping ranges have been held to be prima facie evidence of obviousness. It would have been obvious to one having ordinary skill in the art at the time the invention was made to have modified the teachings of Fung by selecting the portion of Fung's weight percent range for each alcohol component that corresponds to the claimed range. *In re Malagari*, 182 USPQ 549 (CCPA 1974).

With respect to the claimed weight ratio of ethylene to propylene, in light of Fung teaching overlapping wt% range of each alcohol component, it is expected that the weight ratio of ethylene to propylene produced by the process of Fung would overlap with the present claimed range. Moreover, Fung teaches one may vary the desired olefin product by employing greater proportion of the corresponding alcohol in the feed (e.g., greater proportion of ethanol results in additional ethylene in the olefin product). See specifically col. 2, line 66 to col. 3, line 11 and col. 4, lines 26-30.

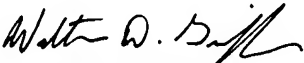
Art Unit: 1764

Any inquiry concerning this communication or earlier communications from the examiner should be directed to In Suk Bullock whose telephone number is 571-272-5954. The examiner can normally be reached on Monday - Friday 6:00-2:30.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Glenn Caldarola can be reached on 571-272-1444. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free).

I.B.


Walter D. Griffin
Primary Examiner